CLAIMS

What is claimed is:

1. A method for a systematic approach to forming experimental designs for large, complex systems, the method comprising:

(a) generating and developing an idea for a product;

(b) develop an experimental design for the product, wherein the experimental design includes:

(c) determining critical variables for the product;

(d) setting a design matrix $U_k = 0$ and $k = 0$;

(e) generating a base design matrix X;

(f) running $Y(P) = (I-B(B^TB)^{-1}B^T)[(X\ P)//U]A$ & Wynn's criterion,

where P is a permutation matrix, I is an identity matrix, B is a blocking matrix, B^T is a transposed matrix of B, and A is a matrix composed of causal map-based coefficients; and

(g) creating a design matrix U_k.

2. The method of Claim 1, wherein step (b) further includes:

(h) setting $k \leftarrow k + 1$;

(i) running an algorithm to choose the best of random column permutations matrices P;

(j) running an algorithm to choose the best column permutation matrix P that is near a previous solution; and

(k) setting $U_k \leftarrow [XP^k$ with rows from U_{k-1} appended].

3. The method of Claim 2, wherein step (b) further includes:

(l) determining whether the design U_k is at desired size; and

(m) if the design U_k is not at the desired size repeating steps (h) through (m) until step (l) indicates that the design U_k is at the desired size.

4. The method of Claim 2 wherein step (b) further includes (n) setting the experimental design using U_k if step (l) indicates that the design U_k is at the desired size.

5. The method of Claim 4 further including:

(o) manufacturing prototype wafers using the experimental design U_k;

(p) determining model responses from the prototype wafers;

(q) determining whether the model responses are adequate; and

(r) if the model responses are not adequate repeating steps (f) through (r) until step (q) indicates that the model responses are adequate.

6. The method of Claim 5 further comprising:

(s) assess and propose manufacturing tolerances for the design U_k;

(t) determine if the proposed manufacturing tolerances are manufacturable; and

(u) if the manufacturing tolerances are not manufacturable repeating steps (b) through (t) until it is determined that the manufacturing tolerances are manufacturable.

7. The method of Claim 6 further comprising (v) sending the design U_k to production if it is determined that the manufacturing tolerances are manufacturable.

8. The method of Claim 7 wherein step (e) includes:

(w) creating a causal network diagram using information determined in ste (c);

(x) creating an internode link-count distance matrix using information from step (w);

(y) creating a causal map using information from step (x);

(z) identifying response nodes from the causal map created in step (y); and

(aa) calculating map-based coefficients from the information in the causal map.